

The Situation of Damage and Reconstruction in Wenchuan Earthquake

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Republic of China**

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Content

1.Introduction of the Earthquake

2.Damage of the road infrastructure

3.Situation of relief efforts

4.Rebuilding measures



Introduction of the Earthquake



2008年5月12日
四川汶川县发生8.0级地震，
多个省市有震感

震中
北纬31.0度
东经103.4度

汶川县

成都

重庆

贵阳

海口

银川

石家庄

西安

洛阳

武汉

郑州

南京

杭州

北京

上海

中国地震带分布

地震自救

□ The most damaging

□ Spread to the widest range

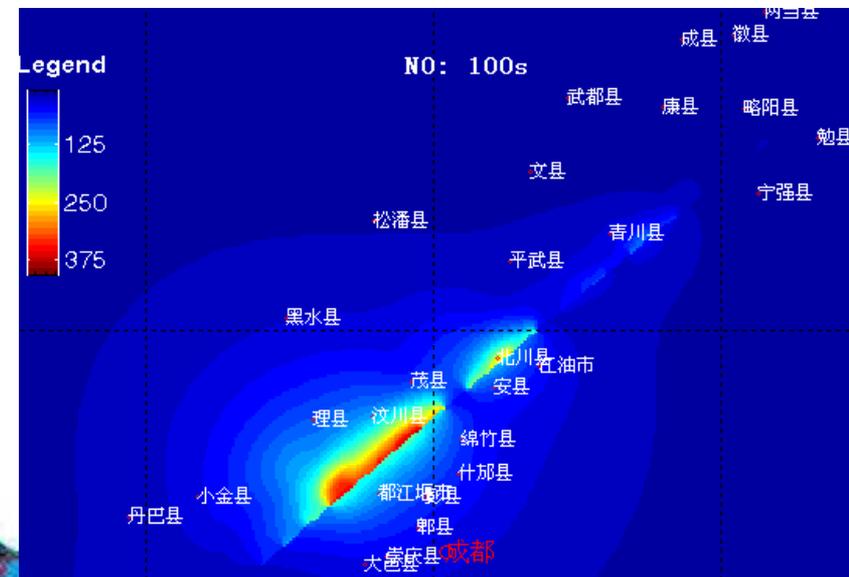
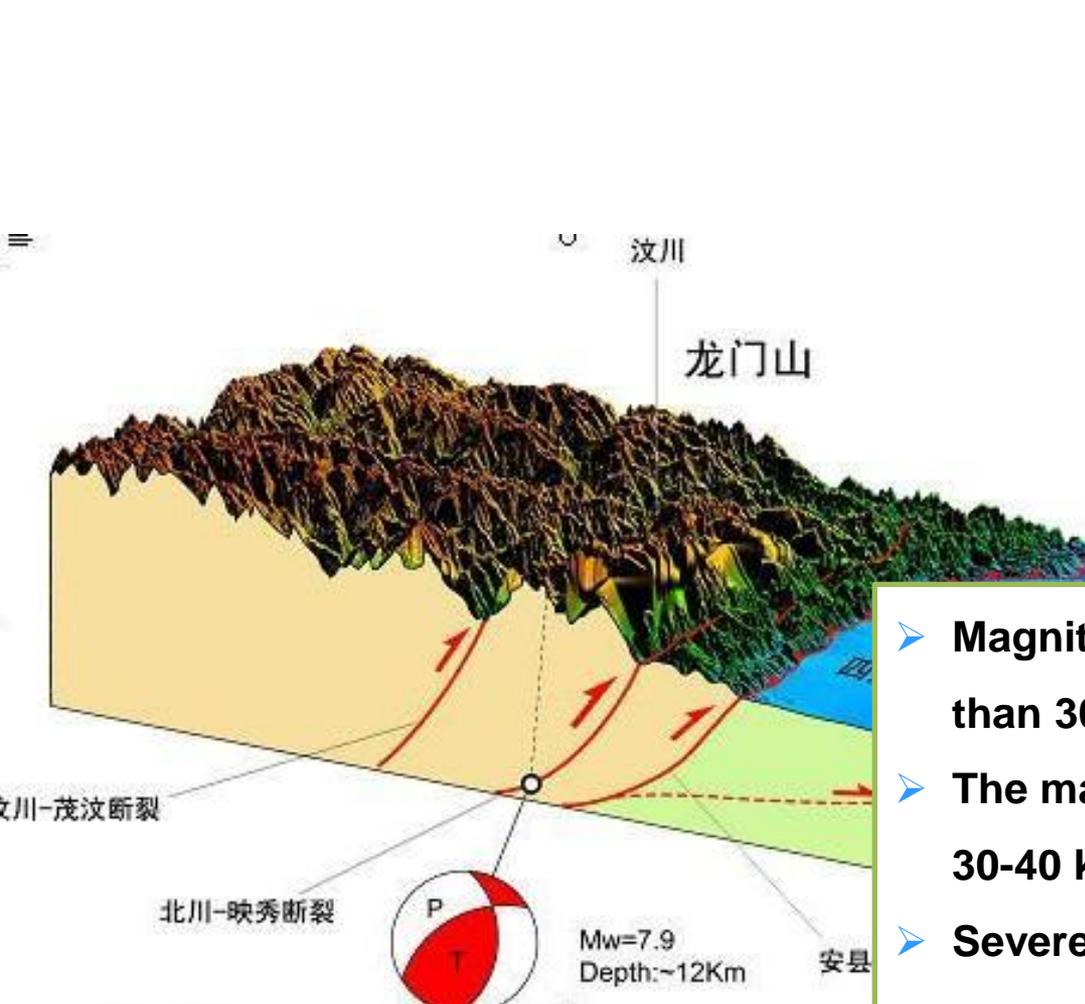
□ The most difficult relief



Introduction of the Earthquake



- High magnitude 、 Great intensity 、 Spread wide range

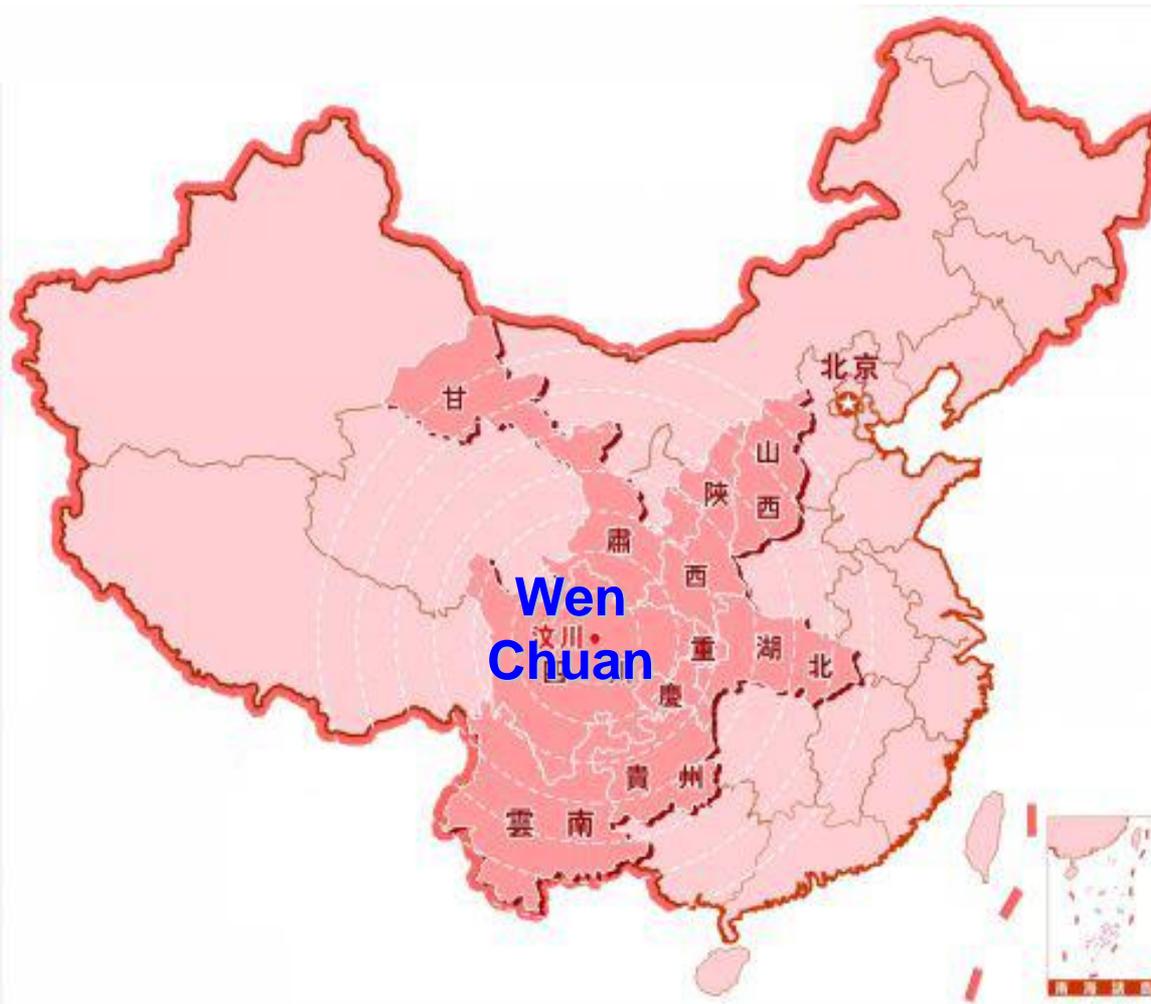


- Magnitude 8.0 , Maximum intensity 11 , more than 30000 aftershocks
- The main earthquake area : 300 km length、30-40 km width
- Severely damaged areas : more than 120,000 square km

Introduction of the Earthquake



➤ The disaster affected very large area



- Total area of the disaster about 500,000 square kilometers , including 10 provinces, 417 counties
- Disaster-stricken people :more than 46,250,000
- Serious disaster area:130,000 square kilometers
- 69,227 dead、 17,923 missing,15.1 million people need to be relocated
- The most serious damaged: Sichuan, Gansu and Shaanxi

Introduction of the Earthquake



➤ Destructive strong, serious losses

- A large number of houses were damaged and collapsed
- Large-scale infrastructure were damaged
- The environment were severely damaged
- Direct economic losses : 845.1

billion Yuan



Introduction of the Earthquake



➤ **The following secondary disaster is rare in the world**

➤ Avalanches, landslides, mudslides ,
quake-lakes and so on



G312 Yingxiu - Wenchuan mountain collapse records



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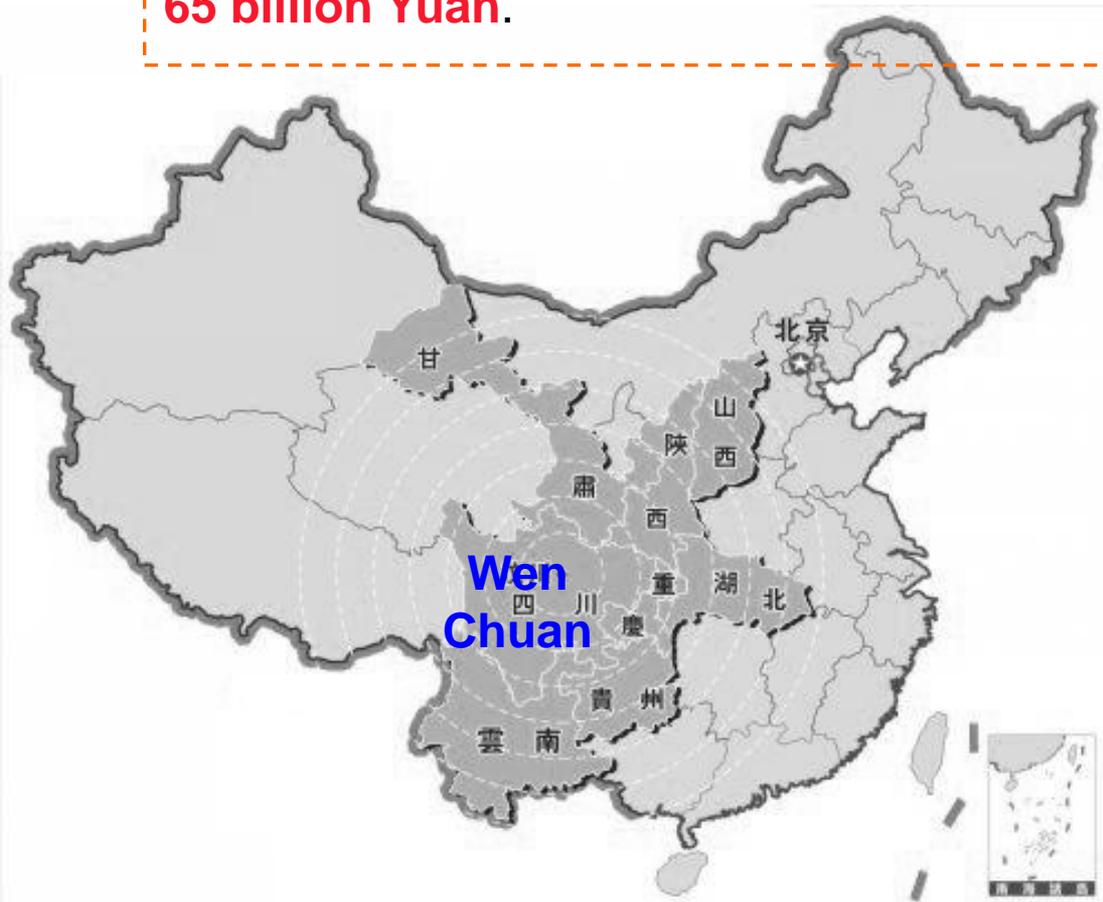
4.Rebuilding measures



Damage of the road infrastructure



General damaged roads in national disaster areas amounts to **53,295 kilometers**, bridge **5526**, tunnel **130**. The traffic equipment loses more than **65 billion Yuan**.



Especially:

22 thousand kilometers roads damaged in Sichuan Province, **3391 kilometers** national and provincial roads and **902 main bridges** are damaged. Transportation facilities loss amounts to **58 billion Yuan**.

Damage of the road infrastructure



Roadbed ,pavement, protection works

Bridges

Tunnels





Damage of roadbed and pavement





2008 06 07



2008 06 07

Damage of roadbed and pavement



2008 06 06



2008 06 08

















FOTON



The roadside protection works has saved many lives



Damage of the road infrastructure



Roadbed ,pavement, protection works

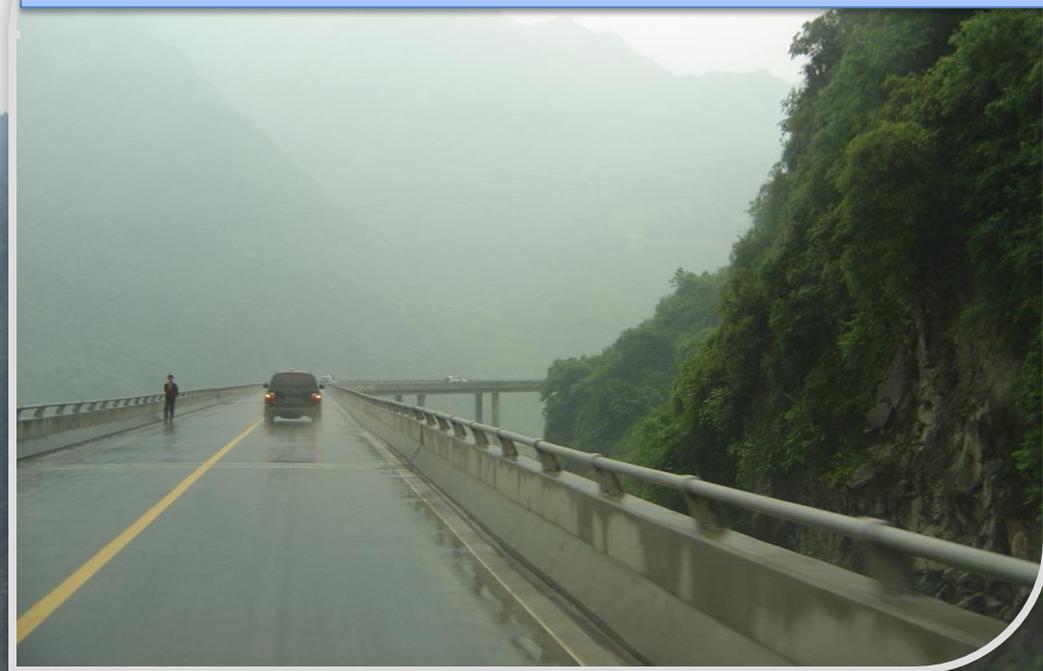
Bridges

Tunnels





G213 Baihua bridge ,Duwen road



Miaoziping bridge in Duwen Road



The bridge approach is a simple supported T-shape beam, spans 50 meters with a continuous deck structure, the high bridge piers are double-column , one of them dropped in the earthquake.

The pier sheared failure for vulnerability



Damage of the road infrastructure



Roadbed ,pavement, protection works

Bridges

Tunnels



Longxi Tunnel



Tunnel exit have been partially collapsed and fallen under the influence of the earthquake

Tunnel exit were buried



Lining work were cut
and damaged



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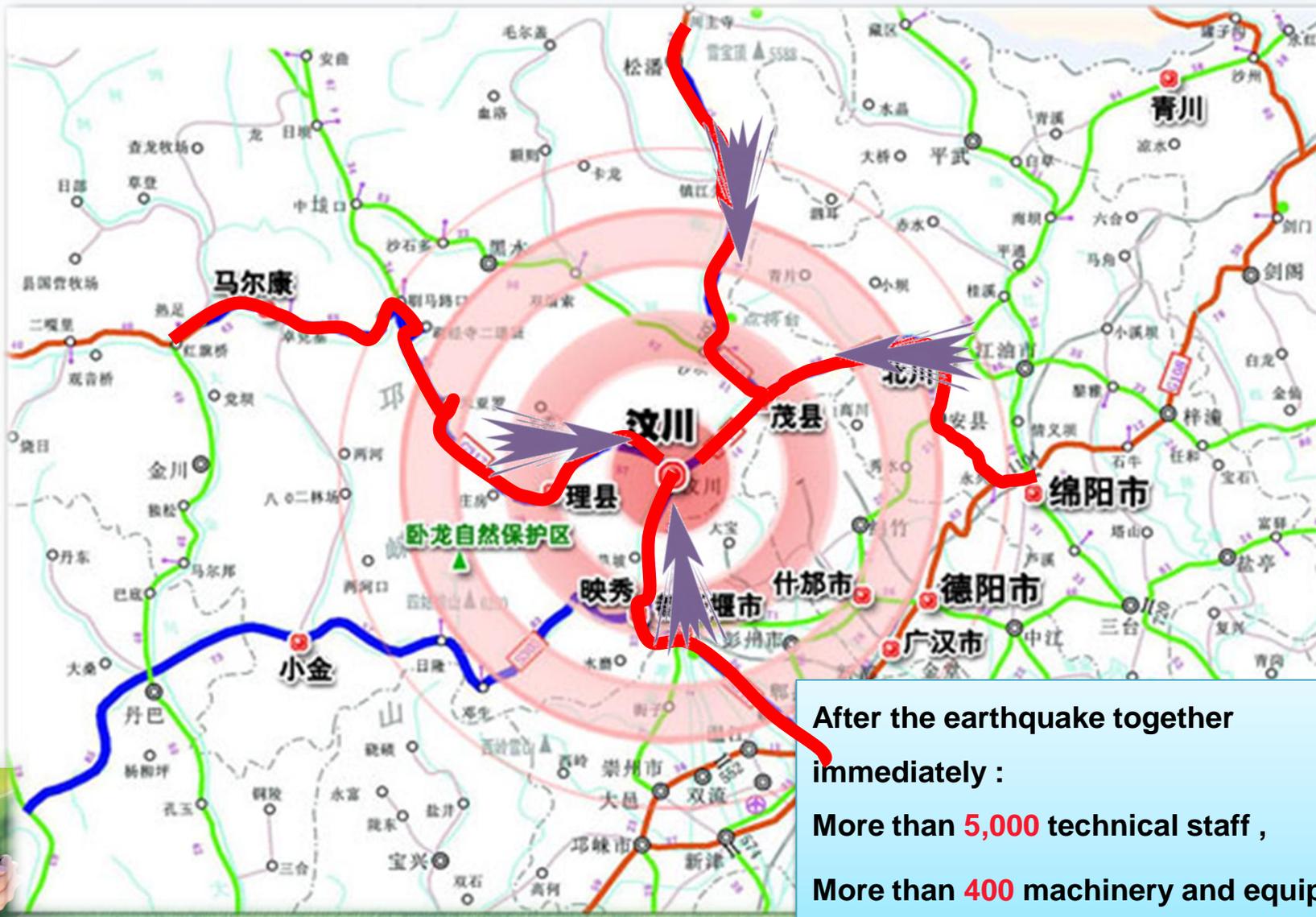
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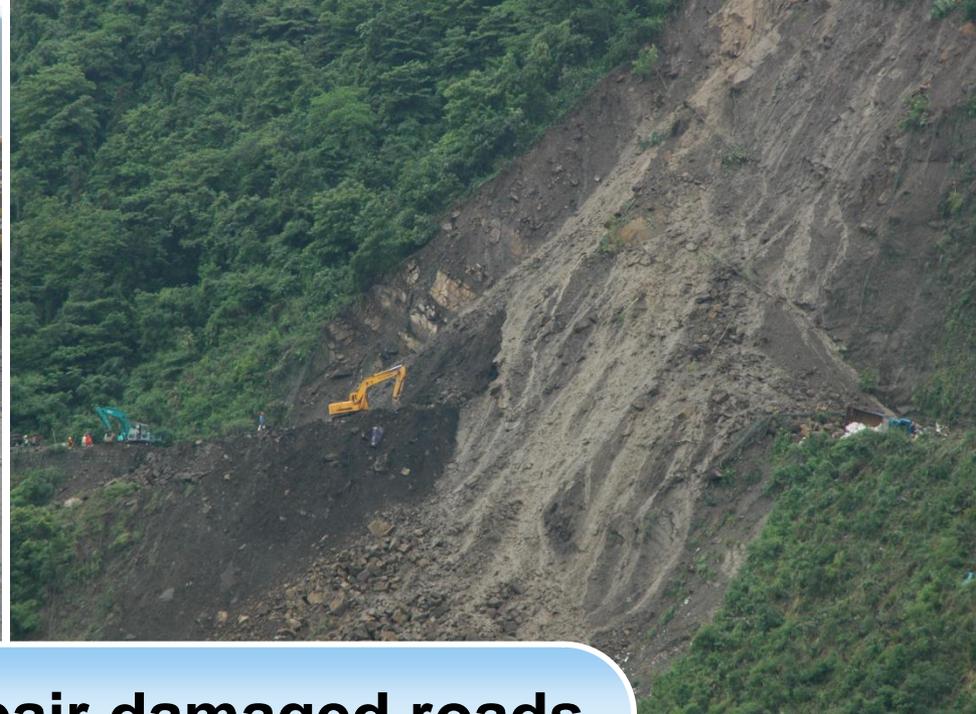
3.Situation of relief efforts

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Situation of relief efforts -- Repaired obstructed road





Strive hard to repair damaged roads



Ferry machinery to the disaster areas by waterway



Shipping assault boat to the disaster areas for damaged road



Summary of relief work



- The national transportation system total input:
 - Relief workers: **10.54 million**
 - Machinery: **447,000**
 - Funds: **2.93 billion Yuan**
- Organized 12 provinces rescue team cumulative about 3201 people and 651 sets machinery into the disaster area to repair the damaged road.



Summary of relief work



- Coordinated and assembled 1195 emergency trucks from neighboring provinces to ensure the transportation of the relief workers, materials and disaster-stricken people.
- Summoned the transportation system donated 262 units different kinds of machinery for disaster areas :
 - **Excavators, Loaders, Bulldozers, Dump trucks, Generators, etc**
- At the end of September, repair the damaged roads cumulative **53020 kilometers**



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Recovery and reconstruction targets after the disaster



Recover transportation infrastructures in disaster area with 3 years in expect

Ensure the main road working, initially build the lifeline project in disaster areas

Appropriately increasing the coverage of rural road, and strive to achieve

Restore the county and township bus terminal, provide a safe and convenient travel for

Recover and reconstruct 5 state roads, 16 provincial roads, repair and continued construct 10 highways, start to construct 4 highways in disaster areas.



Recovery and reconstruction targets after the disaster



2010 year

- National and provincial roads
 - Improve the technical level
 - Ability to resist disaster
 - Transportation support

- Rural roads
 - Improve the level of coverage and operation

Providing powerful support for disaster areas recovery, rebuilding , the development of society and economy in the future



Expectation



More reasonable roads network in disaster areas

Road infrastructure has basically recover to pre-disaster level, the main roads technical grade improved

The level of rural roads coverage and operation Improved

Planned and constructed the lifeline network, the ability of main roads against disaster will significantly enhanced



Technical Countermeasures



Improve lifeline-project criterion of seismic fortification

Strengthen the geological survey, select the scientific rebuilding plan

Using technical index flexible

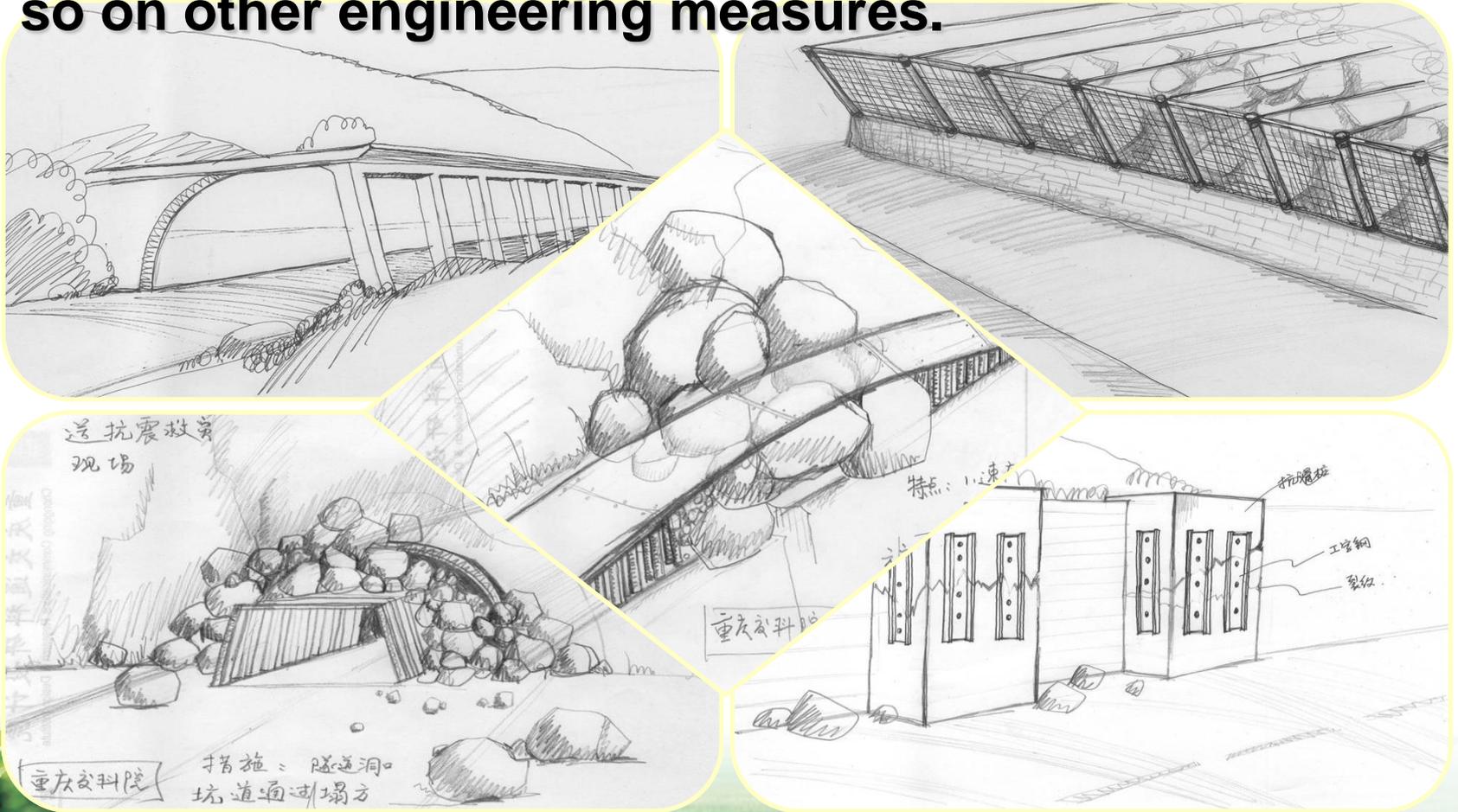
According to local conditions choose reasonable project plan



Technical Countermeasures



A combination of "avoid, block, drill, shed, cross" and so on other engineering measures.



Following work

❑ Simplify procedures of the preliminary works for reconstruction

❑ Increase investment of state funds

❑ Increase land and give priority to construction of transport infrastructure

❑ Increase taxes, the credit policy support

❑ Central government, suitable support provinces and disaster areas all should play important role

❑ Prepare prevention to secondary disaster, ensure smooth transportation





Thanks!

